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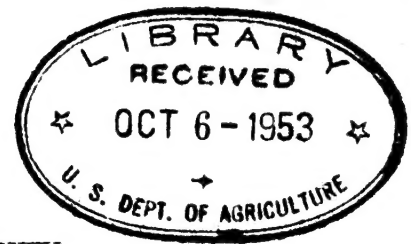
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UNITED STATES DEPARTMENT OF AGRICULTURE  
Bureau of Entomology and Plant Quarantine



SUMMARY OF COOPERATIVE GRASSHOPPER EGG SURVEY

Fall of 1938

During July 1938, major flights of Melanoplus mexicanus, the largest in recent history, occurred in the Northern Great Plains area. These developed from large reservoirs of this species which hatched out in numbers of 1,000 to 10,000 per square yard in idle and weedy range lands adjacent to cropped fields. These reservoirs were located in large areas of North Central South Dakota east of the Missouri River, which ran northward into North Dakota and thence diagonally north westward across that State and in other areas in the southwestern part of North Dakota.

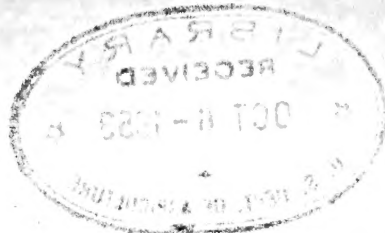
The flights were to the Northeast, North, and Northwest, and Southwest, infesting new territory in the Red River Valley of Minnesota and North Dakota, parts of northern North Dakota, a reinfestation in the Mandan to Dickinson area of that same State, the eastern half of Montana which had no serious infestation to begin with, a large part of the extreme eastern part of Wyoming, and the Black Hills area of western South Dakota respectively.

These flights were not prevented by control measures largely because of two things. First, that farmers are loathe to poison grasshoppers on any land other than that belonging to them. Second, there was a lack of man-power to get the bait spread fast enough to keep ahead of the development of the infestations.

On the western plains, Dissostertia longipennis moved out to the more eastern and southeastern plains area of Colorado, spread over a wider area in the Panhandle of Texas, remained in about the same general area in northeastern New Mexico, and occurred also in the extreme northwestern third of the most western county in the Panhandle of Oklahoma.

Effect of Rains on the 1938 Grasshopper Populations.--The tons of bait estimated as needed for grasshopper control in 1939 are summarized in tabular form by States and special problems.

Surveys conducted on the same basis as in the Fall of 1937 indicate that the potential grasshopper outbreaks in certain States or parts of States have been reduced by seasonal rains. In Iowa the potential is one-half of what it was last Fall, and in Missouri, one-third. With a combination of poisoned bait campaigns and weather working against the hoppers, this potential is now one-half in Oklahoma, two-thirds in Kansas, one-half in Wisconsin, and lowered in Michigan, Nebraska, and Oregon. Direct observations throughout the season showed definitely that areas of heavy egg deposition in Iowa, Missouri, and the eastern part of both Nebraska and Kansas, and elsewhere did not develop heavy nymphal populations because of the effects of continued rains.



UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

STANDARD OF PESTICIDE CERTIFICATION

Page 1 of 2

During the year 1953, the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, has been engaged in a study of the various types of pesticides which are used in the control of insects and other pests of plants and animals. This study is being conducted in order to determine the relative merits of the various types of pesticides and to determine the best method of applying them.

The first type of pesticide which is used is the contact type. This type of pesticide is applied to the surface of the plant or animal and kills the pest by direct contact. The second type of pesticide is the systemic type. This type of pesticide is applied to the plant or animal and is absorbed by the body. It then moves through the body and kills the pest from within.

The third type of pesticide is the fumigant type. This type of pesticide is applied to the air and kills the pest by breathing it in. The fourth type of pesticide is the bait type. This type of pesticide is applied to the food of the pest and kills the pest by eating it.

On the basis of the above, it is recommended that the following types of pesticides be used in the control of insects and other pests of plants and animals: contact type, systemic type, fumigant type, and bait type.

It is also recommended that the following methods of application be used: spraying, dusting, baiting, and fumigation.

Further studies are being conducted in order to determine the relative merits of the various types of pesticides and to determine the best method of applying them. It is hoped that these studies will result in the development of new and improved types of pesticides and methods of application.



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Reasons for Increased Bait Needs in Parts of the Area.--In Minnesota, flights of M. mexicanus moved into the Red River Valley, which was comparatively lightly infested at the beginning of the season. Parts of North Dakota were reinfested by the flights after the local outbreaks had been satisfactorily dealt with. In eastern Montana, regions of comparatively light infestations were seriously affected by the migrations of mexicanus. This is also true for eastern Wyoming and the extreme western part of South Dakota. All of which has added to the quantities of bait needed for control in these areas.

In States having large acreages of so-called idleland, much more of this has been included in the calculations this year because of more accurate figures for these acreages and better surveys of this type of land from the standpoint of sources of grasshopper infestations. This has been considered as a separate and additional item for bait estimates for Montana, North Dakota, South Dakota, and Wyoming. Areas of range-land in these four States severely and very severely infested with mexicanus in the vicinity of crop lands have also been considered separately and additionally to calculations made in the Fall of 1937. All of which has added materially to what our estimates of bait needs would have been had we included in our calculations only those acreages used in 1937.

In spite of a reported 70 to 90 percent reduction in population by control measures of D. longipennis in that area, the problem remains about the same and even greater in Texas. This is due to the great fecundity of grasshoppers in general, and also to the fact (and this applies to all the species in all the areas), that there has been an almost unbroken favorable egg-laying period this fall, up into November. Melanoplus differentialis and M. bivittatus are building up again in eastern South Dakota, and this accounts in part for additional needs for bait in that State where the mexicanus problem has been greatly reduced. Over the entire area, it may be said that the infestations for next year, 1939, will not be as severe as in 1938. Egg predators have already reduced the good egg pods 25 to 75 percent in much of the mexicanus area. Control measures where 90 percent kills were reported have been of material help. These, together with rains, have reduced the potential for the entire area.

November 18, 1938

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TONS OF BAIT ESTIMATED AS NEEDED FOR GRASSHOPPER CONTROL IN 1939

TONS BAIT: BAIT ESTIMATED NEEDED FOR 1939

STATES	ESTIMATED: FOR 1938:	CROP AND IDLELAND Bait Acres:	TONS Tons	IDEALAND :Tons Bait:	M. MEXICANUS RANGELAND: Bait Acres:	D. LONGIPENNIS RANGELAND: Tons	TOTAL
Arizona	205	(No survey by Minneapolis Office)	:	:	:	:	:
Arkansas	940	177,000	885	:	:	:	885
California	140	(No survey by Minneapolis Office)	:	:	:	:	:
Colorado	10,152	1,082,077	5,406	:	:	4,572,560	14,860 : 20,256
Idaho	410	218,241	1,087	:	:	:	1,087
Illinois	2,038	410,187	2,050	:	:	:	2,050
Iowa	21,052	2,495,981	12,480	:	:	:	12,480
Kansas	6,643	958,266	4,779	:	:	:	4,779
Michigan	1,656	290,864	1,455	:	:	:	1,455
Minnesota	8,390	2,646,802	13,237	:	:	:	13,237
Missouri	8,534	512,871	2,564	:	:	:	2,564
Montana	5,018	2,103,463	7,837*	2,680	3,489,688	8,724	19,241
Nebraska	15,736	2,745,315	13,730	:	:	:	13,730
Nevada	72	110,992	556	:	:	:	556
New Mexico	2,178	5,232	28	:	:	2,467,640	8,049
North Dakota	38,369	8,198,395	34,458*	6,533	935,875	2,340	43,331
Oklahoma	4,052	392,674	1,963	:	:	50,000	2,125
Oregon	314	45,600	236	:	:	:	236
South Dakota	25,642	5,575,417	24,040*	3,846	604,523	1,511	29,397
Texas	14,000	910,045	4,549	:	:	4,127,000	17,977
Utah	706	111,547	555	:	:	:	555
Washington	200	265,901	1,331	:	:	:	1,331
Wisconsin	9,945	933,839	4,671	:	:	:	4,671
Wyoming	2,019	693,886	2,672*	794	1,109,749	2,774	6,240
TOTALS	178,411	30,884,595	140,569	13,853	6,139,835	15,349	36,471

Number of tons of bait estimated as needed for entire area.....206,242

\* Idleland considered separately in Montana, North Dakota, South Dakota, and Wyoming.

November 18, 1938



ESTIMATED COSTS for 1939

Total tons of bait estimated for 1939 (survey).....	206,242 T.
Less bait-tons of materials on hand (estimated).....	<u>55,000 T.</u>
Tons of bait to be purchased 1939 (estimated).....	151,242 T.

Cost of purchase and delivery of 151,242 tons of bait at \$15 per ton (estimated).....	\$2,268,630
Storage and mixing of bait; administration and general supervision.....	<u>824,000</u>
Total estimated cost (excluding control of migratorial species).....	\$3,092,630
Estimated cost of control of migratorial species in certain areas.....	<u>1,619,917</u>
GRAND TOTAL COST	\$4,712,547

November 18, 1938

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